

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Penetrating cardiac trauma: 20-y experience from a university teaching hospital

Bruno Monteiro Tavares Pereira, MD, MSc, FCCM,^{a,*} Vitor Baltazar Nogueira, MD,^b Thiago Rodrigues Araújo Calderan, MD,^a Marcelo Pinheiro Villaça, MD, MSc,^a Orlando Petrucci, MD, PhD,^c and Gustavo Pereira Fraga, MD, PhD, FACS^a

^a Division of Trauma Surgery, Department of Surgery, School of Medical Sciences (FCM), University of Campinas-UNICAMP, Campinas, São Paulo, Brazil

^b UNICAMP, São Paulo, Brazil

^c Division of Cardiac Surgery, Department of Surgery, School of Medical Sciences (FCM), University of Campinas-UNICAMP, Campinas, São Paulo, Brazil

ARTICLE INFO

Article history:

Received 9 December 2012

Received in revised form

4 January 2013

Accepted 8 February 2013

Available online 5 March 2013

Keywords:

Trauma

Cardiac trauma

Penetrating injuries

ABSTRACT

Background: Penetrating traumas, including gunshot and stab wounds, are the major causes of cardiac trauma. Our aim was to describe and compare the variables between patients with penetrating cardiac trauma in the past 20 y in a university hospital, identifying risk factors for morbidity and death.

Methods: Review of trauma registry data followed by descriptive statistical analysis comparing the periods 1990–1999 (group 1, 54 cases) and 2000–2009 (group 2, 39 cases). Clinical data at hospital admission, Injury Severity Score (ISS), Glasgow Coma Scale (GCS), and Revised Trauma Score (RTS) were recorded.

Results: The incidences of penetrating cardiac injuries were steady within the period of study in the chosen metropolitan area. The two groups were similar regarding age, mechanism of trauma (gunshot × stab), and ISS. Group 1 showed lower systolic blood pressure at admission (mean 87 versus 109 mm Hg), lower GCS (12.9 versus 14.1), lower RTS (6.4 versus 7.3), higher incidence of grade IV–V cardiac lesions (74% versus 48.7%), and were less likely to survive (0.83 versus 0.93). The major risk factor for death was gunshot wound (13 times higher than stab wound), systolic blood pressure < 90 mm Hg, GCS < 8, RTS < 7.84, associated injuries, grade IV–V injury, and ISS > 25. We observed a tendency in mortality reduction from 20.3% to 10.3% within the period of observation.

Conclusions: Several associated factors for mortality and morbidity were identified. In the last decade, patients were admitted in better physiological condition, perhaps reflecting an improvement on prehospital treatment. We observed a trend toward a lower mortality rate.

© 2013 Elsevier Inc. All rights reserved.

* Corresponding author. Division of Trauma Surgery, Department of Surgery, School of Medical Sciences (FCM), University of Campinas-UNICAMP, 181 Rua Alexander Fleming, Cidade Universitaria Prof. Zeferino Vaz, Campinas 13.083-970, São Paulo, Brazil. Tel.: +55 19 3521 9450.

E-mail address: drbrunomonteiro@hotmail.com (B.M.T. Pereira).
0022-4804/\$ – see front matter © 2013 Elsevier Inc. All rights reserved.
<http://dx.doi.org/10.1016/j.jss.2013.02.015>

1. Introduction

Penetrating cardiac injuries have been described since ancient times and are still considered a challenge by trauma surgeons because of their lethality and urgency of treatment. By the turn of the past century, treatment had moved from simple clinical observation to surgical intervention and the diagnostic procedures had advanced from a clinical physical examination to include Focused Assessment Sonography for Trauma (FAST), cardiac echocardiogram, and multislice computed tomography scan [1].

Survival rate of penetrating cardiac injuries has increased because of advances in prehospital care (PHC), fast transportation to trauma-referenced facilities, and advances in perioperative trauma surgery. The outcomes of patients are influenced by the following factors: mechanism of injury, physiological status of the patient on emergency room (ER) admission, cardiac tamponade, severity of cardiac injury, and other acute associated complications and injuries. The mortality rate due to penetrating cardiac injuries ranged from 15% to 40% in our literature review [2–7].

Our aim was to describe and compare the variables associated with patients with penetrating cardiac trauma admitted over the past 20 y, identifying the risk factors for complications (in general) and death rate. The secondary objective of this article was to determine whether local improvements in PHC have been reflected in better prognoses of penetrating cardiac injury patients.

2. Patients and methods

Our hospital facility is one of the tertiary referral centers in trauma care within a metropolitan area corresponding to approximately 2.7 million people. All trauma victims were treated based on the Advanced Trauma Life Support guidelines (ATLS). Each cardiac injury case was prospectively recorded in the Division of Trauma Surgery database (EPI-INFO software, version 6.04; Center of Disease Control and Prevention - CDC).

After institutional review board approval (protocol 540/2009), a retrospective analysis of prospectively recorded data was carried out.

The prevalence and outcome of all hospital-admitted cardiac injuries from January 1990 to December 2009 were analyzed. Because of the substantial changes which had occurred in the PHC system, we divided the patients into two groups: group 1, patients with cardiac trauma admitted within the period January 1990 to December 1999 (before PHC changes) and group 2, patients with cardiac trauma admitted within the period January 2000 to December 2009 (after PHC changes). There were no age or sex restrictions as inclusion criteria. The first step in the selection method was the identification of the cardiac trauma victims. For each patient, a register was completed with the following epidemiologic and trauma-related information: name, age, sex, mechanism of injury, clinical findings on admission, diagnosis, surgical findings and treatment, complications, Revised Trauma Score (RTS) [8], Organ Injury Scale (OIS) [9], Injury Severity

Score (ISS) [10], Trauma-Injury Severity Score (TRISS) [11], and length of hospital stay.

The RTS was registered on the patient's arrival at the ER [8]. The ISS and TRISS were calculated within the first 24 h [10,11].

The severity of cardiac injuries was graded according to the OIS developed by the American Association for the Surgery of Trauma (AAST), Table 1 [9]. Blunt cardiac injury patients were excluded from this study. Trauma surgeons treated complex cardiac injuries with the cooperation of in-house cardiac surgeon staff.

Patients with deep hypotension (systolic blood pressure [SBP] < 90 mm Hg), hemodynamically unstable and/or with an initial chest tube output >1.5 L were rushed to the operating room for an emergency anterolateral thoracotomy. In patients who were hemodynamically stable at initial evaluation, the cardiac injury was investigated by the following examinations: echocardiogram, pericardial window (PW) (via sub-xiphoid incision), multislice computed tomography scan, or thoracoscopy [12]. In the PW, we usually perform a midline incision of 5–10 cm just below the xiphoid process. After the section of skin and subcutaneous tissue, we continue to dissect cranially under the xiphoid. After dilatation of the pericardial-phrenic recess, we visualize the pericardial sac. To avoid misinterpretation, an accurate hemostasis is necessary. You can also perform the transdiaphragmatic window, which is a procedure that allows rapid diagnosis of cardiac injury in patients in whom the priority is the laparotomy. FAST examinations have been performed in the ER on all patients since 2008, when equipment and training of staff allowed the use of the new method. In hemodynamically stable patients, a positive FAST scan was an indication for an immediate PW (via subxiphoid incision) before proceeding to definitive care in accordance with trauma surgery team protocol.

All continuous variables were expressed as mean \pm standard deviation. The categorical data were expressed as frequency and percentage.

The university's statistics department performed a comparison between the two groups using chi-square test or Fisher test for categorical variables as appropriate. The nonparametric Mann–Whitney test was applied for the comparison of continuous variables between the two groups.

As logistic regression aims to estimate the odds ratios and we were seeking the risk factors, we were thus oriented to use the Cox proportional hazards stepwise regression analysis. This was therefore performed to assess morbidity and mortality after penetrating cardiac trauma (hazard ratio).

3. Results

During a 20-y period, ending in December 2009, 93 patients with penetrating cardiac injury were admitted and managed at our trauma center. Eighty-five patients were male (91.4%) and the average age was 30.8 ± 11.8 y, reflecting a local young male predominance in violent trauma. Forty-five patients (48.4%) sustained stab wounds (SW) and 48 patients (51.6%) were victims of gunshot wounds (GSW). Thirty-two victims (34.4%) were admitted hypotensive (mean 96.2 ± 38.0). The average Glasgow Coma Scale (GCS) of all patients at hospital

Download English Version:

<https://daneshyari.com/en/article/4300893>

Download Persian Version:

<https://daneshyari.com/article/4300893>

[Daneshyari.com](https://daneshyari.com)